LAYING FLOCK MANAGEMENT

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Laying Flock Management

C. E. Ostrander and G. H. Thacker

Good stock and good facilities are very important to successful poultry farm operations, but neither is of much value unless good management is attained. Chicks from the same parents and from the same hatch will perform very differently on different farms; one flock may be very successful, another only reasonably successful, and another may be completely unsuccessful. The difference is management. It may be a serious lack of care, but more often it is a lack of numerous little things that adds up to a big total.

There is no question that management can be the difference between success and failure.

Good Stock

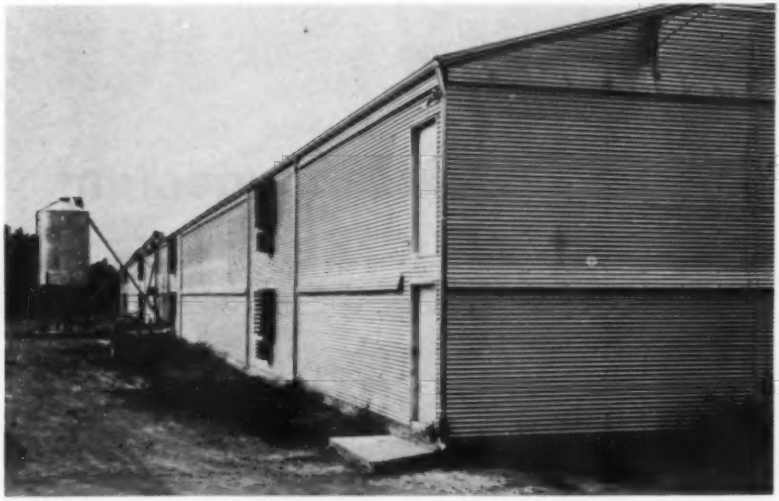
Selecting good stock is not the problem today that is was a few years ago. The Random Sample Tests have made it possible for commercial egg producers to select uniformly productive chicks. Because good stock is widely distributed, there is little excuse for not having it.

Good chickens mature early, are capable of producing 225-250 eggs on a hen-housed basis, produce large eggs, are non-broody, and have low mortality rates.

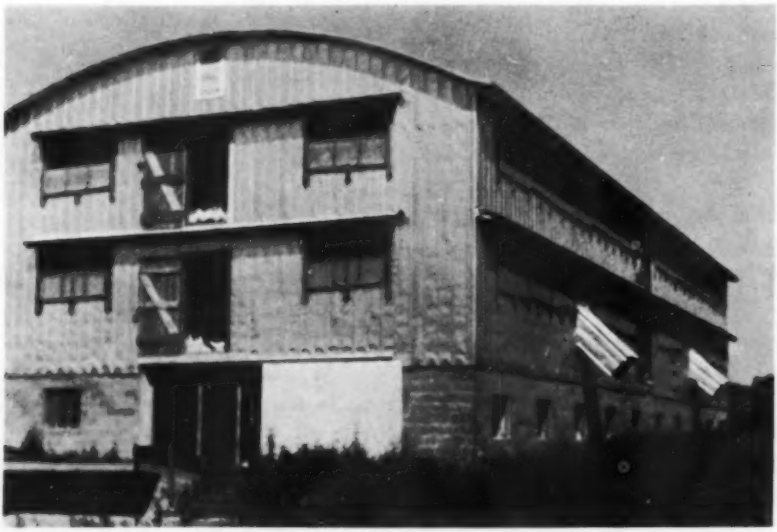
Housing Pullets

The house should be thoroughly cleaned before pullets are placed in it. Old litter may contain parasites and disease organisms, and mites on the roosts and in cracks can seriously infest new flocks. A good program should be carried out for control of lice, mites, and northern fowl mites.

The pullets should be handled carefully when housing; serious damage can result from rough handling at this time. If you are filling more than one pen, it is wise to house pullets according to maturity to eliminate competition and to provide a more uniform pen of birds. It has been shown that birds produce better if they are placed in pens containing no more than 500 to 1000 birds each.



A two-story windowless laying house.



Conventional three-story laying house with windows.

For a few days after housing, it is wise to use the same types of feeding and watering devices in the laying pen that were used in the rearing pens or on range. Nests should be available when the pullets start to lay to prevent their laying on the floor.

Laying Houses

Many types of houses are completely satisfactory, but there are certain characteristics that are essential. The house should be warm in the winter and relatively cool in the summer. To maintain these conditions, the house should be insulated with an *R* factor of six to 10 in the sidewalls and 12 to 15 in the ceiling.[1] A two-inch blanket type insulation in the sidewalls and three inches or its equivalent in the ceiling will provide this insulating factor. Plans are available through your county agricultural agent or the Cornell Poultry or Agricultural Engineering Departments for various types of poultry houses.

Properly constructed houses are relatively easy to ventilate if they are no more than 36 to 48 feet wide. When properly installed, the exhaust ventilation system is satisfactory in New York State, and is much cheaper to install than the pressurized ventilating system. Refer to Cornell *List of Publications* for more information on this subject.

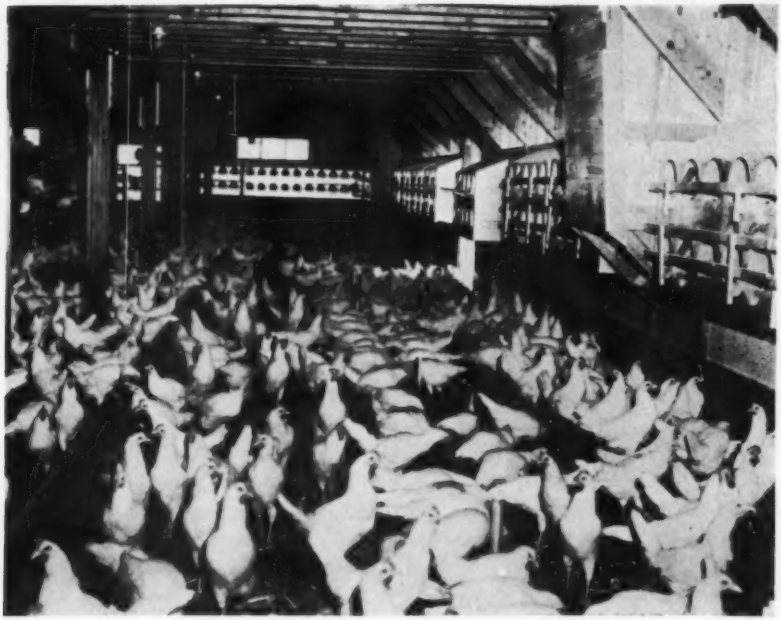
[1]The *R* factor is a measure of resistance of the loss of heat through the material.

The ideal temperature inside the house is between 45°F. and 75°F. It may be difficult to keep the inside temperature below 75°F. in the summer, but should not be difficult to maintain 45°F. or above during the winter if the house is properly insulated. If the litter system is used, a very thin layer of litter will help to cool the birds during the summer. With the generally high humidity in New York State, fogging has been of little help in keeping birds comfortable during hot weather. Ceilings at least seven feet from the floor help to keep the house comfortable.

Houses with a minimum size of 36 feet by 100 feet are much more adaptable to efficiency devices than small houses.

Housing Systems

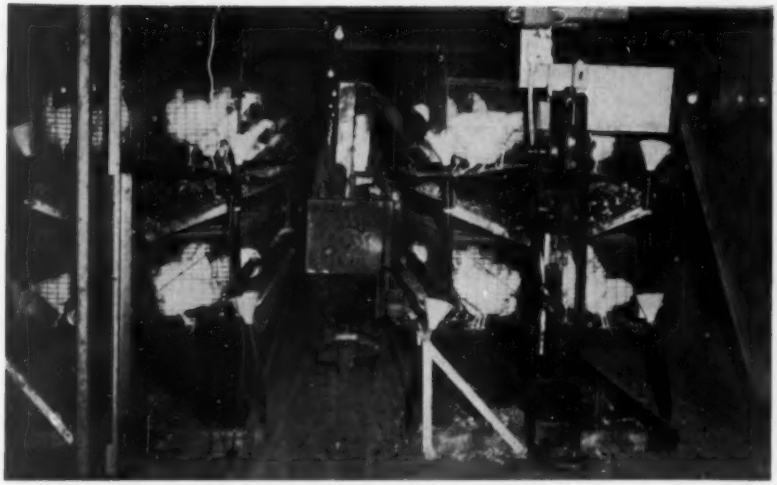
Over the past few years several systems of housing have been developed and promoted. They include the standard litter system with one or more droppings pits, tiered roosts with feeders and waterers on them, slat floors, wire floors, or a combination of slat or wire floors with litter areas and cages for one or more birds. The practice of feeding and watering over the droppings pits is recommended to help keep the litter dry. All of these systems work satisfactorily if managed properly. It is easy to find successes or failures with any one of them. If you decide to use any one of them, check into it thoroughly and then do the best job possible.



A conventional litter house, 48 feet by 100 feet, with housing at two square feet per bird. Roosting area is in center of building.

Tiered roosts with feeders and waterers on the roosts and one feeder around the perimeter of the house. The birds are housed at one square foot per bird.

Combination slat and litter system with litter in the center third of the house at one square foot per bird.



Double-deck cage system with two birds in a 10-inch cage. Electric feed cart can be seen between cages. Birds are fed twice daily. Droppings are removed by mechanical cleaners.

Colony cage system with 20 birds in each three-by four-foot section. Both single deck and double deck are shown. Mechanical cleaners remove droppings; birds can be fed by feed cart or mechanical feeders.

If you have been operating a conventional litter system and change to one of the above-mentioned systems, you will need to change your management practices somewhat. In the newer systems, birds are usually more concentrated than in the conventional litter system. They require additional feeder and water space, more ventilation, and make adequate insulation absolutely essential. Concentrated housing may intensify cannibalism and will certainly make more nesting space necessary.

When feeders and waterers are placed over the droppings pits, some poultrymen are housing birds at one square foot per bird or even less. The recommendation, however, is to allow at least 1¼ to 1½ square feet per bird. Income per house and per man must be considered, but income per bird cannot be ignored. There is no percentage in providing housing for and caring for 5000 birds if the same income per man can be obtained from 4000 birds.

Many poultrymen can increase their capacity by some concentration, even with the conventional litter system. With a well-insulated and ventilated building, concentrating to two square feet per bird, or even less, is satisfactory if more feeder space, water space, and nests, are provided.

Following the general procedure of good management will prove satisfactory for any system. This includes: (1) providing satisfactory environmental conditions, (2) feed and water easily accessible, (3) feed and water no more than 10 to 15 feet from any bird, (4) proper ventilation, (5) plenty of feed and water space, (6) providing adequate artificial light, and (7) controlling parasites and diseases.

Feeding and Watering

Feeding has changed considerably over the years. Unless one has a very large operation, complete home-mixing cannot be recommended. It is too difficult to obtain all of the ingredients of good quality and it is very difficult to get a good mixture when using small amounts. However, the use of concentrates with locally grown or home-grown grains has become very popular. Now that corn can be grown profiitably in the Northeast, considerable savings can be made by using these local grains.[2] These can be used in a mash and grain program or can be ground and mixed with a concentrate in an all-mash program.

Considerable interest has been aroused recently in the use of simplified diets for layers. These appear to be working satisfactorily, but they require very strict adherence to recommendations. Slight variations could be disastrous. Poultrymen should stay alert to the progress in this development.

All-mash feeding has become a standard practice for large poultry operations. It is adaptable to mechanical feeding, is less bother, and it assures a more nearly balanced ration.

[2]New York State College of Agriculture mimeograph, "Using Local Grain for Poultry." Department of Poultry Husbandry.

Vertical mixer used to mix local grains with concentrate. Scale is at rear; grinder on floor below.

The latter is very important today with our highly productive birds. Results are very satisfactory with all-mash even with no supplements, such as pellets, if *sufficient* feeder space is provided.

Tests have shown that the amount of feeder space is very important. A minimum of four inches per bird should be provided; increases in egg production have been shown for feeder space up to six inches per bird when all-mash was used. When the feeder space is five to six inches per bird, no increase in egg production is shown by supplementing with pellets.

The tiered system of feeding, where feeders are located one above the other on the roosts, should be supplemented by a line of feeders around the perimeter of the house if a single eight-foot wide stack is used in a house 40 or more feet in width.

Along with all-mash and mechanical feeding, bulk handling of feed has gained popularity. It requires less lifting, is more convenient, there is less waste and damage from rats, and it usually is somewhat cheaper.

The poultryman should aim for a feed efficiency of four to 4.5 pounds of feed per dozen eggs. Production must be high and waste low in order to attain this efficiency (table 1).

The location of water is far more important than the size of the fountain. Fountains should be located so that birds are no more than 10 to 15 feet away from water at any time. Because it is important to have water available at all times, it is best to use two or more fountains. If one fountain fails, the birds will still have water. In cages, where there is only one source of supply, the fountain should be checked frequently.

Field tests have shown 1.2 water stations or more per 100 birds give best results. A loss of 33 eggs per bird has been shown when this was cut to 0.2 stations per 100 birds.[2]

Water should be fresh and the waterers should be kept clean. If older uninsulated houses are used, heating cables or circulating systems should be installed to prevent water from freezing.

[2] A station is any waterer up to four-feet of trough. Every four feet of trough is considered to be a station. *Fresh Approach to Laying House Profits* by Robert B. Wallace.

Table 1. The average amount of feed required per day and per dozen eggs by 100 hens.*

Eggs per 100 hens per day	Feed for 4-pound hens		Feed for 5-pound hens	
	Per day	Per dozen eggs	Per day	Per dozen eggs
	pounds	pounds	pounds	pounds
0	15.6	.....	17.8	.....
10	17.0	20.5	19.2	23.2
20	18.5	11.1	20.7	12.4
30	19.9	8.0	22.1	8.8
40	21.3	6.4	23.5	7.1
50	22.8	5.5	25.0	6.0
60	24.2	4.8	26.4	5.3
70	25 6	4.4	27.8	4.8
80	27.0	4.1	29.2	4.4
90	28.5	3.8	30.7	4.1
100	29.9	3.6	32.1	3.9

*Taken from University of Illinois Extension Circular 606.

Because it is important to have plenty of cool water during hot weather, additional water stations may be advisable. Deep waterers are much better than shallow ones during hot weather, because they allow the wattles to become wet and help to cool the bird.

Temperatures over 85°F. for long periods of time cause decreased pro-

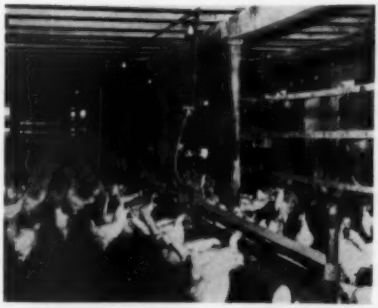
Unloading feed into bulk-feed storage bin. Hydraulic blower elevates feed into bin.

Water fountain is between two runs of feeder. Opposite side of house has same arrangement.

duction unless the birds can be made comfortable. Lots of water and turbulent air will help to keep birds comfortable.

Provide shell hoppers throughout the house to supply the birds with sufficient calcium. In cage operations, oyster shells often are added to the mash once or twice a week to supplement the calcium in the mash.

When mash and grain are used, grit should be supplied in grit hoppers throughout the house. There is not complete agreement about whether grit is necessary when all mash is used.



Water fountain above feeder is very convenient for birds, but overflowing causes wet feed.

Lights

Tests at Cornell have shown that the best lighting system uses one 40-watt or 60-watt bulb for each 200 square feet of floor space at seven or eight feet above the floor. A 60-watt reflectorized bulb that has long life and provides very good distribution of light is available. This system provides two-foot candles of light intensity at the feeders. Light intensities above two-foot candles at the feeders have not proven to be beneficial to the chicken.

Watch and check the new developments in lighting. Do not invest large sums of money until you are sure of returns on your investment. Many of the new systems have not been satisfactory.

Light bulbs should be kept clean. Wipe them every two weeks and wash them when necessary. Dirty bulbs can cut light output 25 percent. Flourescent lights are satisfactory but, watt for watt, they supply no more red rays (those which are beneficial to the bird) than do incandescent lights. Flourescent lights are costly to install, running nine to 10 times the cost of installing incandescent fixtures.

Tests have been conducted on the use of photo-electric cells for turning lights on during dark days. Birds appear not to need lights during dark days if normal window area is supplied.

It makes little difference if light is supplied in the morning, in the evening, or part in the morning and part in the evening if 14 hours of light are supplied. It is easier to supply a uniform day if morning and evening lights are used. If this is done, you need not change the time clocks continuously.

Nests

Pullets must be trained to use nests when they first start to lay. It is usually more difficult to get pullets to lay in wire-bottomed, roll-away nests than in conventional nests. The roll-away nests permit rapid cooling of the eggs and help to produce clean eggs if the wire is kept clean. It is very important that the collecting lip or area adjacent to the collecting belt be kept clean to prevent wire marks on the eggs. The chickens keep the floor area clean.

Roll-away nest with mechanical pick-up belt in front.

Roll-away nest of the colony type with mechanical pick-up belt at rear of nest. Cover is raised to show birds in nest and eggs on pick-up belt.

Nests should be provided at the rate of one nest for each five birds or its equivalent in colony nests when conventional nests are used.

Interest has been high for roll-away nests with collecting belts. These have possibilities but many installations have not saved as much labor as was anticipated. These will be improved and poultrymen will learn more about managing them as time goes on. There are several commercial egg-collecting devices on the market and many poultrymen have developed home-made devices that work satisfactorily. Less nesting area is required when roll-away nests are used.

If litter nests are used, the litter should be kept clean and deep to prevent soiling the eggs. Shredded sugar cane, shavings, straw, sawdust, or one of the many commercial products make satisfactory nest litter. When using conventional litter nests, eggs should be gathered three or more times each

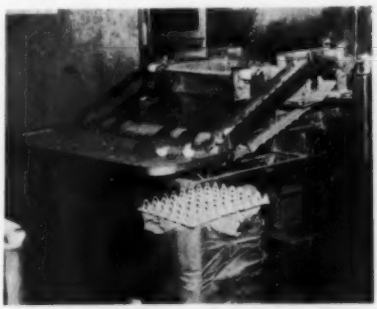


Table for mechanical egg collector. This machine collects eggs from multiple tiered nests.

day, preferably twice during the morning when laying is heavy and once late in the afternoon. Eggs should be collected from cages regularly. Eggs exposed to warm, dry room air all day will deteriorate considerably, especially during warm weather.

Litter

If the conventional litter system is used, six to eight inches of litter should be built up before cold weather arrives. Many types of litter can be used, but the more absorptive the material and the more surfaces exposed, the better. Long straw is not very satisfactory for litter. Chopped straw is much better. Crushed corn cobs are satisfactory if dry. Dry, soft wood shavings also make good litter. A good practice is to use a combination of a fine and a coarse material such as shavings and chopped straw. Many commercial litters are satisfactory, but cost should be considered.

Cannibalism

Cannibalism, as mentioned previously, is more of a problem in flocks concentrated at one to 1½ feet per bird than when birds are housed at three feet per bird. Very intense lighting or glass front houses also appear to intensify cannibalism which does not appear to be a problem in windowless houses, even when birds are concentrated.

Other management practices that encourage cannibalism are feeding all pellets, having open-front nests that are in bright light, and having feeders at such a height that the vent is exposed when the chicken is eating. Feeders should either be at or near floor level or high enough that birds on the floor cannot reach the bird's vent when she bends over to eat. Cannibalism can be controlled by proper debeaking.

Culling

Culling is fast becoming a lost art and probably rightly so. There is little need to cull the flock of today except to take out obviously sick birds. In most flocks there are a few "driven birds" but, if these are removed, others will appear in a short time. This is apparently a result of the social order, or pecking order, and it appears that little can be done about it except to use individual cages.

Pullets or Old Hens?

Records indicate that it is not profitable to keep layers over for the second year of production unless you have a special market that pays a premium for extra large eggs. If such a market is available, the birds should be force molted and given a six to eight weeks rest to assure good shell and interior egg quality during the second laying period.

Force molting usually can be accomplished by taking the feed and water away from the birds for one or two days and not providing artificial light. It may be necessary to darken the windows in some instances. Nor-

mally, force molting is done after 12 to 14 months of laying. After the feed and water removal has caused a complete molt, the birds are given only grain for four or five weeks. Mash is then placed in the feeders again and the lights turned on at about the sixth week of rest. This should have the birds back in full production eight weeks after the molt.

In general, the yearling flock will produce 60 percent to 70 percent of what they produced the first year. Normally, however, 70 percent to 75 percent is necessary to make a profit. Feed efficiency per dozen will not be quite so good the second year as it was the first year.

The general recommendation is to lay the flock for 15 to 16 months and then dispose of them. This appears to be the most profitable practice. It is true that replacement cost per dozen eggs can be held down by holding birds over, but production costs are higher and egg quality is lower. Unless you have a special market that pays a large premium for extra large eggs, these eggs are a problem. They do not pack well, the shells do not hold up well, and the interior quality is likely not to be so good as it was the first year.

Cost of Producing Eggs

Feed, replacement, and labor are the three highest costs of producing eggs. Table 2 shows how these costs vary and how they affect the total cost. If all costs are held down and egg production is held up, profits will be satisfactory.

Table 2. Costs and income from poultry flocks

	Cost per dozen eggs		
	Average 17 dozen	Good 18.5 dozen	Aim 20 dozen
Feed costs @ $70 per ton:	Cents	Cents	Cents
17 dozen = 5.5 pounds per dozen	19.25		
18.5 dozen = 5 pounds per dozen		17.5	
20 dozen = 4.5 pounds per dozen			15.75
Pullet replacement costs:			
$1.80 — 32¢ = $1.48 for 12 months	8.7	8.0	7.4
Labor — $1.20 per hour			
5 minutes per dozen	10.0		
4 minutes per dozen		8.0	
3 minutes per dozen			6.0
Housing costs — Depreciation, Insurance, taxes and repairs on house and equipment 15% on $4.00 per bird	3.5	3.2	3.0
Miscellaneous costs	.7	.7	.7
Total cost (12 months)	42.15	37.4	32.85
Returns from eggs	38.0	38.0	38.0
Profit per dozen	— 4.15	.5	5.15
Cost with 16 months lay	39.15	35.1	31.05
Profit per dozen	— 1.15	2.9	6.95

General

It is wise to make changes gradually in the poultry flock. Chickens appear to be creatures of habit, and sudden changes, particularly drastic changes, often upset them. This is very true of pullets in the peak of production and birds nearing the end of their production cycle.

A good vaccination program should be followed for the control of Newcastle disease, infectious bronchitis and fowl pox and laryngotracheitis if these are a problem in the area. Check with your county agricultural agent or poultry disease diagnostic laboratory for information and control measures. A good poultryman constantly checks for lice, mites, and internal parasites and then carries out control measures. Keeping windows and doors screened to keep wild birds out helps greatly to reduce parasite infestations.

Dead birds should be disposed of and not left lying around the poultry pens or yards. Some states now have laws requiring disposition of dead birds in a sanitary way. A properly constructed disposal pit can take care of this problem.

The good poultryman is constantly on his toes. He keeps abreast of current developments, he reads, and he attends meetings that can be of benefit to him. He also keeps records. These need not be complicated, but they should be accurate. Regardless of the accuracy, however, the records are of no value if they are not analyzed regularly. Your county agent or serviceman can help you set up a record system and analyze the records.

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